6.1.1 EQUIPMENT AND SUPPLIES

Temperature instruments must be tested before each field trip and cleaned soon after use (table 6.1–1). Each instrument must have a log book in which all calibrations and repairs are recorded, along with the manufacturer make and model description and serial or property number.

Table 6.1–1. Equipment and supplies used for measuring temperature[1]

[°C, degrees Celsius; L, liter; µS/cm, microsiemens per centimeter at 25°C]

✓ Calibration thermometer, liquid-in-glass sensor, certified by National Institute of Standards and Technology (NIST)
  Temperature range at least –5 to +45°C
  0.1°C graduated

✓ Thermometer, liquid-in-glass sensor
  Temperature range –5 to +45°C
  Minimum 0.5°C graduated
  Calibrated accuracy within 1 percent of full scale or 0.5°C, whichever is less
  Calibrated and District certified against calibration (NIST) thermometer

✓ Thermistor thermometer
  Calibrated accuracy within 0.1°C to 0.2°C
  Digital readout to at least 0.1°C
  Calibrated and District certified against calibration (NIST) thermometer

✓ Dewar flask and (or) plastic beakers (assorted sizes)

✓ Water bath, refrigerated

✓ Soap solution (1 L), nonphosphate laboratory detergent

✓ Deionized water (1 L), maximum conductivity of 1 µS/cm

✓ Flowthrough chamber (for ground-water applications as an alternative to instruments with downhole capabilities)

✓ Paper tissues, disposable, soft, and lint free

✓ Log book, for recording all calibrations, maintenance, and repairs

[1]Modify this list to meet specific needs of the field effort.

- A thermometer is any device used to measure temperature, consisting of a temperature sensor and some type of calibrated scale or readout device. Liquid-in-glass thermometers and thermistor thermometers are most commonly used to measure air and water temperature.
- Extreme field conditions (for example, frigid climates or thermal waters) may require thermometers capable of measuring a broader temperature range.

CAUTION: Do not use mercury-filled thermometers in the field.

The operating instructions for thermometers are provided by the manufacturer.

- **Liquid-in-glass thermometer**—Recommended liquid-in-glass thermometers are total-immersion thermometers filled with alcohol. Before measuring temperature, check the type of liquid-filled thermometer being used. (Partial-immersion thermometers are not recommended: these have a ring or other mark to indicate the immersion depth required.)

- **Thermistor thermometer**—A thermistor thermometer is an electrical device made of a solid semiconductor with a large temperature coefficient of resistivity. An electrical signal processor (meter) converts changes in resistance to a readout calibrated in temperature units. Thermistors commonly are incorporated in instruments used for surface-water and groundwater measurements.

MAINTENANCE, CLEANING, AND STORAGE 6.1.1.A

Thermometers can easily become damaged or out of calibration. Take care to:

- Keep thermometers clean (follow manufacturer's recommendations).

- Carry thermometers in protective cases; thermometers and cases must be free of sand and debris.

- Store liquid-filled thermometers in a bulb-down position and in a cool place away from direct sunlight.

As an additional precaution on field trips, carry extra calibrated thermometers as spares, and a supply of batteries for instrument systems.